

DOCUMENT-IDENTIFIER: US 6197321 B1
TITLE: Drain treatment product and method of use

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ABPL:

A drain sanitizing article (9) for reducing microbiological activity in drain runoff areas having a housing (10), the housing having an inner wall (16) defining an inner opening (18) in the housing, an outer wall (12), and a bottom wall (14) defining a central cavity (15) in the housing (10), a tear strip (20) for destructibly removing the housing outer wall and a portion of the bottom wall (14), a handle (30) spanning the inner opening (18) of the housing (10) and joined to the inner wall (16) of said housing (10); and a chemical sanitizing agent (40).

BSPR:

The present invention relates generally to drain sanitizing articles and more particularly to an improved drain sanitizing article for food processing and preparation environments which will provide prolonged sanitizing in floor drains.

BSPR:

The troublesome reoccurrence of food born diseases caused by psychrotrophic, pathogenic micro-organisms has created strong concern within the food process industry and has fueled a search for new environmental sanitation products targeted at these micro-organisms. Public awareness of food born diseases has dramatically increased recently due to the occurrence of epidemics of both listeriosis and salmonellosis.

BSPR:

The symptoms of these diseases can manifest a number of different forms. In neonatal infants, the disease often can be characterized by symptoms of sepsis or meningitis. In pregnant women, the disease often takes the form of a puerperal sepsis or non-specific flu-like illness which can result in the premature delivery of stillborn or acutely ill infants. Doyle, M. P.; Food Borne Pathogens of Recent Concern; Ann. Rev. Nutr. 1985; Vol. 5, pages 25-41.

BSPR:

The FDA has responded to these recent outbreaks of listeriosis and salmonellosis with expanded plant audits and new test protocols to isolate pathogens in those areas which foster microbiological contaminants. The FDA designed one such procedure for drains, the logic being that pathogens present in the general plant environment would eventually find their way into the drain where growth may occur. In accord with the FDA's renewed focus on this area of the plant environment, there now exists a renewed need for an active continuous drain sanitizer in the food process environment.

BSPR:

The drain sanitizing article of this invention is a solid drain treatment product designed to sanitize, control odors, clean soil, and control biofilm build-up in drains, troughs, and pits. The drain sanitizing article of this invention is also designed to be effective in environments such as overhead drip and collection pans, or any plant or processing area where water flow causes a general environmental sanitation concern in the dairy and food process industries.

BSPR:

The present invention comprises a sanitizing article for

reducing
microbiological activity in drain run off areas, including
a housing having an
inner wall, defining an inner opening in the housing, and
an outer wall, the
inner and outer walls being joined by a bottom wall and
which altogether define
an inner cavity for containing an active chemical
sanitizing agent in the
housing; a tear strip for destructibly removing the outer
wall as well as a
portion of the bottom wall of the housing, the tear strip
being wholly
incorporated into the outer wall of the housing; a handle
spanning the inner
opening of the housing and joined to the inner wall of the
housing; and a
active sanitizing agent which fills the inner void within
the housing.

DEPR:

Referring to the drawings wherein like numerals represent
like parts throughout
the several views, there is generally shown a drain
sanitizing article (9).
Generally, the drain sanitizing article (9) comprises a
housing (10) containing
a chemical sanitizer (40). As shown in FIG. 1, the housing
(10) has an inner
wall (16), an outer wall (12), the inner and outer walls
being cooperatively
connected by a bottom wall (14). The inner wall (16)
defines an inner opening
(18) in the housing (10). As shown in FIG. 2, the inner
wall (16), the outer
wall (12), and the bottom wall (14) define a cavity within
the housing (10) of
the sanitizing article (9). As shown in FIGS. 1 and 2, the
inner opening (18)
of the housing (10) is partially obstructed by a handle
(30). The handle (30)
is cooperatively connected to the inner wall (16) of the
housing (10) at joint
(34).

DEPR:

As shown in FIG. 3, a tab (21) is affixed to a tear strip
(20) which is defined

as the area between the coarsed lines (26). The tear strip (20) facilitates the removal of a portion of the housing (10) which, as shown, includes the outer wall (12) and a portion of the outer perimeter of the bottom wall (14). The tear strip (20) joins perimeter coarsed or molded lines (22) at an abutment point (24), FIG. 2. The perimeter coarsed lines (22) allow complete removal of the intended portion of the housing (10) once the tear strip (20) is used to break the outer wall (12) of the housing (10).

DEPR:

Generally, the housing (10) of the drain sanitizing article (9) should retain a composition, shape and size which facilitates effective application and placement in drain areas in food process environments. Specifically, the housing (10) functions as a mold in the transformation of the chemical sanitizer (40) to hardened form. The housing (10) also serves as a manufacturing, shipping, and storage container preventing premature contamination of the chemical sanitizer (40) prior to use. Finally, the housing (10) serves as a dispenser when the chemical sanitizer (40), now in hardened form, is placed in the intended environment of application.

DEPR:

The polymer used for forming the housing (10) may also be capable of imparting a translucent character or accepting pigments to provide a colored or shaded housing (10), once molded. A dyed chemical sanitizer (40), in combination the translucent housing (10), or a dyed or shaded housing (10) in combination with the chemical sanitizer (40), allows the operator to easily choose the correct drain sanitizing article (9) from the storage shelf merely by visually recognizing the appropriate color. In such an instance,

the individual operator need not resort to a detailed consideration the parameters affecting use of the drain sanitizing article for each of possibly hundreds of drains in the plant such as drain flow, temperature of drainage, intended environment of application, or the specific food processing which is being undertaken at the location of the drain. This may be done initially and then merely followed by the simple replacement of a drain sanitizing article having the same color. Moreover, a translucent housing (10) in combination with a dyed chemical sanitizer or, alternatively, a colored housing (10) in combination with an unpigmented chemical sanitizer (40), allows visual recognition that drain sanitizing article (9) has exhausted the entirety of the chemical sanitizer (40) and must be replaced.

DEPR:

Regarding the shape and size of the sanitizing article, the majority of drains within the food processing industry measure in diameter from 4 inches to 2 feet. Most drains, regardless of their size at the floor level, funnel down to a 4 inch drain pipe. Indeed, a rough survey of the drains most often found in the food processing industry discloses a size range of approximately 6 to 12 inches in diameter. With this in mind, the drain sanitizing article should be shaped and sized to facilitate manufacture, and, most importantly, proper application within the intended environment of use.

DEPR:

Preferably, the outer diameter of the housing (10) is between 6-7 inches as this size has been found to most compatible with drains found in the food processing industry. More specifically, an outer diameter of 6.75 inches and an inner opening of approximately 4.75 inches allows the

drain sanitizing
article (9) to be placed in run-off areas where the housing
handle (30) rests
on a stand pipe (60) which projects into the actual area of
the drain (50),
FIG. 5.

DEPR:

The preferred embodiment of the present invention, provides
a tear away strip
(20), defined as the area between the coarsed lines (26)
and optionally
attached to a pull tab (21). This tear away strip
functions to remove a
portion of the housing (10) to expose the chemical
sanitizer (40) which may
include the outer wall (12) and a portion of the bottom
wall (14). While the
tear strip (20) may be used to remove only the outer wall
(12) of the housing
(10), the tear strip (20) preferably will serve to remove
the outer wall (12)
and a portion of the outer perimeter of the bottom wall
(14).

DEPR:

Upon removal of the outer wall (12), the outer external
surface of the chemical
sanitizer (40) is additionally exposed to the flow of
drainage. The exposure
of the outer wall as well as the lower surface of the
sanitizing prevents
run-off from trickling down the drain walls (50) and
underneath the normally
encased sanitizing article (9), FIG. 4. Where the
sanitizing article is placed
in a conical funneling drain, the exposed chemical
sanitizer (40) will rest
against the narrowing sides of the drain (50). Drain
run-off, coarsing down
the sides of the drain (50) passes over the drain
sanitizing article (9) and
gradually dissolves the chemical sanitizer (40). As the
chemical sanitizer
(40) dissolves the drain sanitizing article (9) gradually
moves down the sides
of the drain maintaining contact with the drain wall (50).
This positioning

combined with the exposure of the chemical sanitizer (40) provides continued maximum surface area exposure to contact run-off over the life of the drain sanitizing article (9).

DEPR:

Generally, the tear strip (20) may take any form which facilitates the removal of a portion of the housing (10). Preferably, the tear strip (20) allows removal of the housing outer wall (12) and the outer perimeter of the bottom wall (14) and is an integral part of a one-piece molded housing (10). As shown, the tear strip (20) is defined by weakened coarse or tear lines (26), (22) which are formed directly into the outer wall (12) and the bottom wall (14) of the housing (10) during the molding process. The use of such an embodiment facilitates the single piece molding of the housing (10) by modern blow, vacuum, and injection molding processes.

DEPR:

Preferably, the tear strip (20) is destructibly removed from the entire housing (10) at the abutment point (24). The abutment point (24) may be formed or defined on the outer wall (12) or bottom wall (14) of the housing (10) depending on the intended exposure to be given the chemical sanitizer (40). The abutment point (24) may be a point where the tear strip separates from the housing (10). The outer wall (12) is thereby opened at the tear lines (26) and may be grasped and removed, FIG. 2, along with the appropriate section of the bottom wall (14), if desired, along the perimeter tear lines (22). Alternatively, the abutment point (24) of the tear strip (20) may be a point where the tear strip (20) is integrally fused to the outer wall (12) or bottom wall (14), if desired, to be removed from the housing (10). Moreover, the tear

strip (20) may be defined or patterned by coarse or tear lines (26) which angle towards the bottom of the housing (10) at less than 90.degree.. An angled tear strip (20) which is integrally fixed to the housing (10) allows removal of the intended portion of the housing (10) and exposure of the chemical sanitizer (40) in one motion.

DEPR:

An additional aspect of the present invention is a handle (30) which spans the inner opening (18) and is cooperatively connected to the housing (10) of the sanitizing article (9). If the chemical sanitizer (40) used is formulated through a heated mixing process, the handle (30) stabilizes the housing (10), preventing disfigurement while the chemical sanitizer (40) cools and hardens. The handle (30) assists in the placement and removal of a sanitizing article (9) within the drain. Also the handle (30) allows the sanitizing article to be easily removed from the drain during the cleaning of the floor and drain. This prevents undo waste of the chemical sanitizer (40) due to the excess run-off and drainage of wash water during such operations. For instance, in areas such as an industrial food product filling or packaging installation cleaning takes place daily. An inability to easily remove the sanitizing article (9) results in an unnecessary exposure of the article to excess drain runoff and drastically shortens the efficacious life span of the article (9).

DEPR:

In application environments having a standpipe protruding into the drain area, the handle (30) further allows placement and support of the sanitizing article housing (10) upon this standpipe, FIG. 5. The handle preferably spans the inner opening (18) of the housing to provide for placement

of the sanitizing article (9) on the protruding standpipe. Given removal of the outer wall (12) and outer perimeter of the bottom wall (14) from the housing (10) such a configuration provides maximum water exposure to the chemical sanitizer (40).

DEPR:

In accordance with another aspect of the present invention, there is provided a chemical sanitizer (40) which comprises a sanitizing agent, a hardener to stabilize and control solubility to the chemical sanitizer (40), and optionally a dye which when combined with the translucent polymeric housing provides a color indicative of the intended use environment the extent of use of the chemical sanitizer (40).

DEPR:

In the food processing industry, bacterial growth is dependent on many factors including the foods processed, the processing environment, including the temperature of the food processing facility as well as the frequency with which the facility is cleaned. Ultimately, bacteria is removed through cleaning processes which rely on disposal or drainage. Consequently, the drain area and any dead space therein presents a primary medium for the continued growth of microbes and bacterial contaminants which may lead to food born infectious diseases. By providing an active chemical cleaner which is capable of "sanitizing", the drain sanitizing article (9) of the present invention precludes the growth of all but the most insignificant amount of bacterial contaminants.

DEPR:

Accordingly, the sanitizing agent used in the chemical sanitizer (40) of the present invention preferably satisfies the definition of

"sanitizer" as by the
AOAC Official Methods of Analysis, Germicidal and Detergent
Sanitizing Action
.sctn.4.028 (1984). This AOAC use-dilution protocol is one
of a small number
of procedures generally recognized and professionally
accepted for measuring
biocidal activity. The sanitizing agent used in the
chemical sanitizer (40) of
the present invention should provide a "sanitizing"
efficacy which will cause
at least about 3 log count reduction or 99.9% in the number
of organisms within
30 seconds to enable use within drains in food processing
environments as
required by EPA Guidelines for the food processing
industry. The present
chemical sanitizer is intended to ensure a continuous
controlled release of the
active sanitizing agents as well as detergents for the life
of the drain
sanitizing article. Moreover, the chemical sanitizer (40)
of the present
invention is intended to provide a certain degree of
variability within its own
chemical and physical properties. As a result, the drain
sanitizing article
(9) may be applied to any number of food processing
environments while still
providing effective sanitizing action once in place.

DEPR:

Generally, any agent or combination of agents which
provides the requisite
degree of hardness and aqueous solubility may be used if
compatible with the
sanitizing agent. However, if the drain sanitizing article
(9) is to be used
in a food process environment where there will be a high
flow of heated
drainage, the hardener should provide a relatively low
degree of aqueous
solubility to the chemical sanitizer (40). Such food
processing environments
are usually found in the critical filling and processing
areas located within
the food processing facilities. In contrast, if the
intended food processing

environment has a lower flow or cool water drainage, the hardener should provide for a higher degree of aqueous solubility allowing release of an effective amount of the sanitizing agent from the chemical sanitizer (40) of the present invention.

DEPR:

While the hardener used in the present invention can be any number of agents or combination of agents, amides and urea have been found to further the intended functions of the drain sanitizing article of the present invention.

Specifically, alkyl amides provide formulation ease when combined with sanitizing agents, such as cationic surfactants, which allows for varied degrees of hardness and solubility and, in turn, versatile application to the many environments found in the food processing industry. Specifically, straight chain aliphatic alkyl amides provide a higher degree of insolubility with a corresponding higher degree of hardness. Generally, the alkyl chain of these amides ranges from C.sub.16 to about C.sub.18. Alkyl chains such as, for example, stearic chains when part of an amide hardener produce a hardened chemical sanitizer (40) where the sanitizing agent dissolves slowly as the hardener dissolves or disperses. Moreover, maintaining the amide as a mono-substituted amide, instead of a di-substituted amide, also ensures a high degree of insolubility and hardness.

DEPR:

When the drain sanitizing article (9), housing (10) is tinted or colored, it may be desirable to retain the natural opaque or light color of the chemical sanitizer (40) in order to provide a color contrast visually indicative of the continued presence of the chemical sanitizer (40) in the drain environment.

However, the chemical sanitizer (40) of the present invention may also contain a dye. The dye functions in combination with the housing (10), when the housing (10) is clear or translucent, as an indicator. Primarily, this indicating function is brought forth first when the drain sanitizing article (9) is placed in the intended environment of use. Specifically, visual inspection of the color of the drain sanitizing article (9) prior to use denotes whether the specific drain sanitizing article (9) is appropriate for the intended use.

DEPR:

Once the drain sanitizing article (9) is placed within the intended environment of use the dye additionally functions to disclose the active presence of chemical sanitizer (40). This allows a visual determination of whether the chemical sanitizer (40) is still present in the housing (10) and, in turn, the drain sanitizing article (9) is still actively working. Often times, a drain cover may partially obscure the drain area and prevent easy visual inspection of a sanitizing article. A colored chemical sanitizer (40), in contrast to a sanitizing that is translucent provides the color contrast with the tinted housing (10) or drain environment (50) necessary to determine whether chemical sanitizer (40) is exhausted. Otherwise, an opaque or translucent color may preclude disclosure of the presence of the chemical sanitizer without removal of the obscuring drain cover.

CLPR:

19. An aqueous soluble article for dispensing a chemical sanitizing agent for sanitizing running and standing aqueous drainage, said drain sanitizing article comprising a solid circular bar having an outer wall and an inner wall, said

inner wall defining an opening in said bar wherein when
said drain sanitizing
article is placed into a drain comprising a drain trap and
a drain pipe, said
solid circular bar outer wall lies adjacent to said drain
trap and said bar
inner wall lies adjacent said drain pipe allowing for the
passage of drainage
over the article into the drain, said article comprising
(a) from about 5 wt-%
to 80 wt-% of an antimicrobial sanitizer, said sanitizer
selected from the
group consisting of an n-alkyl dimethyl benzyl ammonium
chloride, an organic
encapsulated chlorine releasing agent, an inorganic
chlorine source, a phenol
source, an aldehyde, an iodophor and mixtures thereof, and
(b) from about 20
wt-% to 95 wt-% of a hardener, said hardener selected from
the group consisting
of an alkyl amide, a nonionic surfactant, a water soluble
starch, urea, and
mixtures thereof.